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Consulting Engineers Limited

Kingmoor Energy Recovery Facility

Fortum Carlisle Limited

Environmental Permit application – Non-Technical Summary

ENGINEERING CONSULTING

Document approval

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1 Introduction

Fortum Carlisle Limited is developing the Kingmoor Energy Recovery Facility (Kingmoor ERF, the Facility) to incinerate incoming waste fuel on land south of the Kingmoor Park Industrial Estate, near Carlisle.

1.1 The Applicant

Fortum Carlisle Limited is a subsidiary of Fortum Oyj and is the Applicant for the environmental permit application for the Facility. Fortum Carlisle Limited (herein abbreviated and referred to throughout this report as 'Fortum') is registered in England (Company Number: 10098089) and has a registered address of St James House, 13 Kensington Square, London, United Kingdom, W8 5HD.

1.2 The site

The Facility will be located on land adjacent to the Kingmoor Park Industrial Estate, Carlisle, which is accessible from the A689 via Kingmoor Park Road. The stack is located approximately at a National Grid Reference of NY 38145 59189, approximately 4-5 km north-west of Carlisle city centre.

To the north of the Installation Boundary is Kingmoor Park Road. The A689 is to the east of the Installation Boundary and a railway line (the West Coast Mainline) lies approximately 100m from the western boundary. A number of industrial facilities are located to the north, east and south of the Installation Boundary. Carlisle town centre lies approximately 5km south/southeast of the Site.

A site location plan and Installation Boundary drawing are presented in Appendix A of the Supporting Information.

1.3 The activities

The Facility will consist of a single Schedule 1 'Installation Activity' (as defined in the Environmental Permitting Regulations) and Directly Associated Activities (DAAs).

Table 1-1: Environmental Permit Activities

Type of Activity	Schedule 1 Activity	Description of Activity
Installation	Section 5.1 Part A b)	The incineration of non-hazardous waste in a waste incineration plant with a maximum design capacity of up to 31.3 tonnes per hour.
Directly associated activities		
Directly Associated Activities		Waste reception, storage and handling facilities
Directly Associated Activities		Combustion and energy recovery processes including the export of electricity to the National Grid
Directly Associated Activities		Flue gas treatment
Directly Associated Activities		Residue storage and handling facilities

Type of Activity	Schedule 1 Activity	Description of Activity
Directly Associated Activities		Standby electrical generation to provide electrical power to the plant in the event of an interruption in the supply.

The Stationary Technical Unit (the Facility) comprises waste reception; waste storage; water, fuel oil and air supply systems; furnace; boiler; steam turbine/generator set; facilities for the treatment of exhaust gases; on-site facilities for treatment or storage of residues and waste water; flue with associated stack; and devices and systems for controlling combustion operations and recording and monitoring conditions.

Assuming a design NCV of 10 MJ/kg, the Facility will process approximately 250,000 tonnes per annum (at the design capacity of 31.3 tph, assuming 8,000 hours availability). This is represented by point P2 on the firing diagram – refer to Appendix A.

Allowing for the full range of NCV wastes that the Facility can process (8-15 MJ/kg), and assuming continuous operation throughout the year (i.e. 8,760 hours of operation), the Facility will have a maximum capacity of up to approximately 274,000 tonnes per annum.

2 Details of the proposed Facility

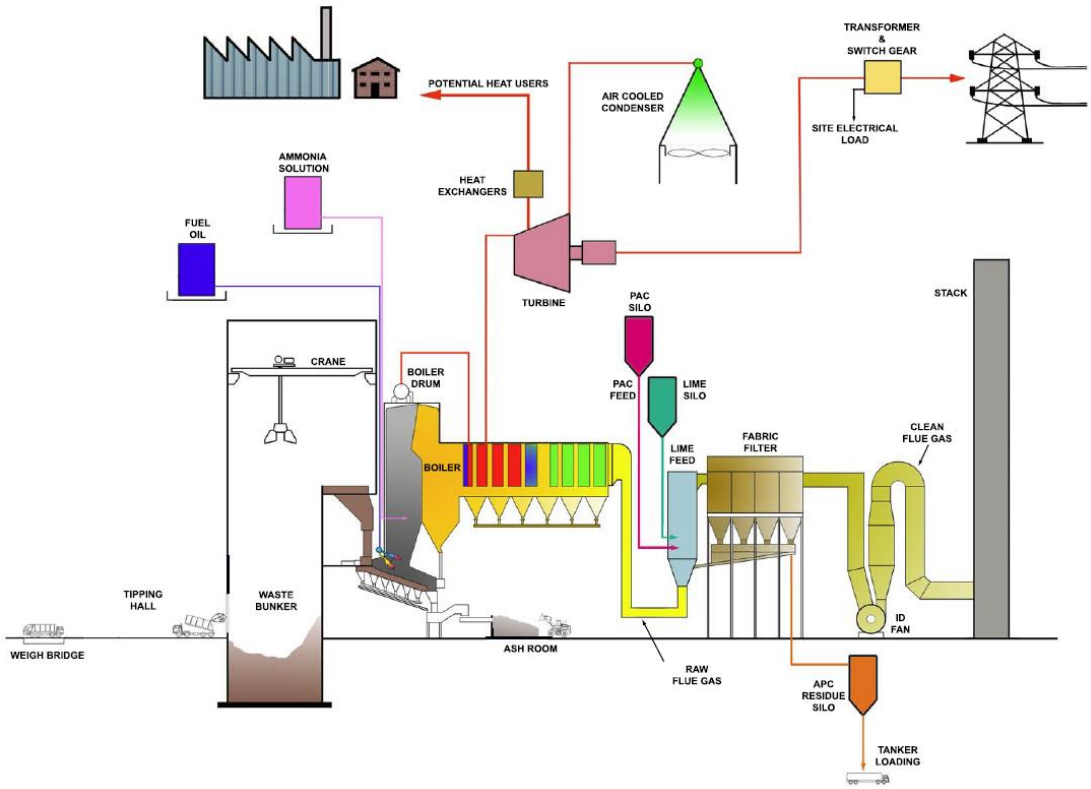
2.1 The process

The Facility will include the following processes:

1. Waste will be delivered to the Facility and unloaded into the waste bunker.
2. Waste would be transferred from the waste bunker into the feed hopper for the waste incineration plant.
3. Emissions of nitrous oxides would be controlled by the injection of ammonia solution into the combustion chamber.
4. Hot gases from the waste combustion would be passed through a boiler to raise steam. The steam would then be passed to a steam turbine to generate electricity for export to nearby users and the National Grid, with the potential to export heat to local heat users.
5. The combustion gases would be cleaned in a flue gas treatment plant. This would include the injection of carbon, primarily to control dioxin emissions, the injection of lime to control acid gas emissions, and the use of a fabric filter to remove dust.
6. The cleaned exhaust gases would be released to atmosphere via a stack of 70 m.

An indicative process diagram for the Facility is presented below.

Figure 1: Indicative Schematic of the Waste Incineration Process



2.2 Raw materials and feedstocks

The Facility will utilise a number of different chemicals and raw materials within the different power plant processes. The chemicals and raw materials used at the site will include, but not be limited to, the following:

- lime (CaO);
- activated carbon;
- ammonia solution;
- mains water;
- non-hazardous mixed waste;
- auxiliary fuel; and
- water treatment chemicals.

These will be supplied to standard specifications offered by different suppliers. All chemicals will be handled in accordance with COSHH Regulations as part of the quality assurance procedures and full product data sheets will be available.

Periodic reviews of all materials used will be made in the light of new products and developments. Any significant change of material, where it may have an impact on the environment, will not be made without firstly assessing the impact and seeking approval from the Environment Agency (EA).

The Operator will maintain a detailed inventory of raw materials used and will have procedures for the regular review of developments in raw materials used.

2.3 Emissions

2.3.1 Emissions to air

Emissions from the Facility will be released from a stack of 70 m. Detailed air dispersion modelling of emissions from the stack has been undertaken. This has demonstrated that the Facility will not have a significant impact on local air quality, the general population or the local community, either alone or in-combination with other plans and projects.

The Final Draft Waste incineration BREF was published by the European IPPC Bureau in December 2018, with the Final BREF BAT Conclusions subsequently published on 3 December 2019. Upon adoption of the final BREF, the Environment Agency is required to review and implement conditions within all permits which require operators to comply with the requirements set out in the BREF. This includes the Facility. The BREF introduces BAT-Associated Emission Limits (BAT-AELs) which are more stringent than the ELVs currently set out in the IED. For most pollutants it has been assumed that emissions from the Facility will comply with the BAT-AELs for a 'new' facility, or the emission limits from Annex VI Part 3 of the Industrial Emissions Directive (IED) for waste incineration plants where BAT-AELs are not applicable.

2.3.2 Emissions to water and sewer

There will not be any discharges of process effluent to water from the Facility.

Where practicable process effluents will be re-used within the process. Excess amount of process effluent will require discharge, which will be discharged into the foul water sewer system in accordance with a Trade Effluent consent which will be secured from the Sewerage Undertaker.

Surface water run-off from buildings, roadways and external areas of hardstanding will be discharged into the surface water drainage system. The surface water will pass through silt traps and oil interceptors, where identified to be appropriate, prior to being discharged into a surface water storage tank. The surface water storage tank will have a discharge into an on-site attenuation pond prior to release off-site to the Cargo Beck (shown as emissions point W1 in the emissions drawing in Appendix A of the application).

Domestic effluents from welfare facilities will be discharged to foul sewer in accordance with a Trade Effluent Consent.

2.4 Monitoring

There will be continuous monitoring of emissions to air of the flue gases from the Facility. The monitoring system will include monitoring of oxygen, carbon monoxide, hydrogen chloride, sulphur dioxide, nitrogen oxides, hydrogen fluoride, ammonia, VOCs, and particulates. Other pollutants will be monitored by spot measurements at regular intervals. All continuous emissions measurements will be recorded, and operators will be alerted if emissions to air approach the permitted limits. The results of all emissions monitoring will be reported to the EA.

The Facility will utilise modern control systems, which incorporate the latest advances in control and instrumentation technology. These systems will optimise the operation of the Facility.

2.5 Ground conditions

A Site Condition Report (Appendix B of the application) has been developed which details the ground conditions at the time of submission of the EP application.

All chemicals will be stored in an appropriate manner to ensure appropriate containment and secondary and tertiary abatement measures where appropriate. The potential for accidents, and associated environmental impacts, is therefore limited.

Deliveries of all chemicals will be unloaded and transferred to suitable storage facilities. Areas and facilities for the storage of chemicals and liquid hazardous materials will be situated within secondary containment, such as bunds. Secondary containment facilities will have capacity to contain whichever is the greater of 110% of the tank capacity or 25% of the total volume of materials being stored, in case of failure of the storage systems.

Tanker off-loading of chemicals will take place within areas where the drainage is contained with the appropriate capacity to contain a spill during delivery.

Upon cessation of the operation of the Facility, a site closure plan will be implemented, and any pollution risks will be removed from the site. The ground will be returned to a ‘satisfactory state’.

2.6 Technology selection

The processes have been designed against the background of a detailed assessment of the prevailing environmental conditions at the site location, in order that the objectives of the Industrial Emissions Directive (IED) are met. Best Available Techniques will be employed at the Facility to minimize its impact upon the local environment.

A quantitative BAT Assessment has been completed for the Facility – refer to Appendix F of the Application. This has demonstrated that the proposed techniques to be employed at the Facility will represent BAT in accordance with the relevant BAT guidance notes.

The following techniques are proposed to be employed at the Facility:

- SNCR with ammonia solution for the abatement of oxides of nitrogen;
- A moving grate for the combustion of waste;
- A dry system for the abatement of acid gases; and
- Lime to be used as a reagent for the abatement of acid gases.

2.7 Residues

The main solid residue streams arising from the Facility are:

1. Incinerator Bottom Ash (IBA); and
2. Air Pollution Control residues (APCr).

It is intended that the IBA from the Facility will be transferred to an off-site IBA processing facility. If a suitable recovery facility will not accept the residue, it may be transferred for disposal in an off-site non-hazardous landfill.

APCr is classified as hazardous and requires specialist disposal or treatment. It may be possible to send the residue to a waste treatment contractor, to be used to neutralise acids and similar materials. Using the residues in this way avoids the use of primary materials. If these options are not available, the APCr will be sent to a suitably licensed hazardous waste landfill for disposal as a hazardous waste.

2.8 Management

To ensure effective management of the Facility, Fortum will develop a documented management system that clearly defines the management structure for the Facility, as well as setting out the roles and responsibilities of all staff.

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